

We claim:

1. A process for the preparation of polyisobutenyphenol-containing Mannich adducts by

a) alkylation of a phenol with highly reactive polyisobutene having a number average molecular weight of less than 1000 and a polydispersity of less than 3.0 at below about 50°C in the presence of an alkylation catalyst;

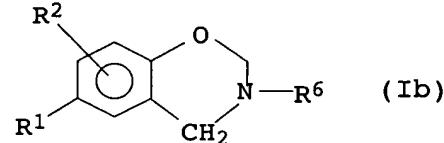
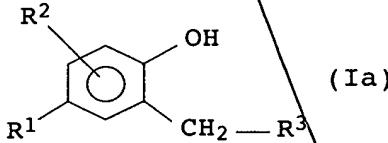
b) reaction of the reaction product from a) with

15 b1) an aldehyde chosen from formaldehyde, an oligomer and a polymer of formaldehyde and

b2) at least one amine which has at least one primary or at least one secondary amino function.

20 2. A process as claimed in claim 1, wherein the amine used is 3-(dimethylamino)-n-propylamine, di[3-(dimethylamino)-n-propyl]amine, dimethylamine, diethylamine or morpholine.

25 3. A process as claimed in either of claims 1 and 2, wherein an adduct mixture is obtained which comprises at least 40 mol% of compounds of the formula Ia and/or Ib,

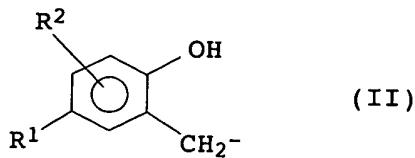


35 where

R¹ is a terminally bonded polyisobutetyl radical,

R² is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or CH₂NR⁴R⁵, where R⁴ and R⁵ have the meanings stated below, and

R³ is NR⁴R⁵, where R⁴ and R⁵, independently of one another, are selected from H, C₁- to C₂₀-alkyl, C₃- to C₈-cycloalkyl and C₁- to C₂₀-alkoxy radicals which may be interrupted and/or substituted by heteroatoms selected from N and O, and phenol radicals of the formula II



where R^1 and R^2 are as defined above; with the proviso that R^4 and R^5 are not simultaneously H or phenol radicals of the formula II; or R^4 and R^5 , together with the N atom to which they are bonded, form a 5-, 6- or 7-membered cyclic structure which has one or two heteroatoms selected from N and O and may be substituted by one, two or three C_1 - to C_6 -alkyl radicals; and

15 R^6 is a radical R^4 or R^5 other than H.

4. A process as claimed in any of the preceding claims, wherein an adduct having a polydispersity of from 1.1 to 3.5 is obtained.

20 5. A process as claimed in any of the preceding claims, wherein R^1 has a number average molecular weight of from 300 to 850.

25 6. A process as claimed in any of claims 1 to 5, wherein the reaction mixture from b) is fractionated by column chromatography over an acidic stationary phase by multistage elution with

30 - at least one hydrocarbon and then
 - at least one basic alcohol/water mixture.

7. A process as claimed in claim 6, wherein the basic alcohol/water mixture used is a mixture of

35 a) from 75 to 99.5% by weight of at least one C_2 - to C_4 -alcohol,
 b) from 0.4 to 24.4% by weight of water and
 c) from 0.1 to 15% by weight of at least one amine which is volatile at room temperature.

40 8. A process as claimed in any of the preceding claims, wherein the adduct mixture obtained includes from 0 to 20 mol%, preferably 1 to 15 mol%, of polyisobutlenylphenols from reaction step a) which have not been further reacted.

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9. A Mannich adduct obtainable by a process as claimed in any of claims 1 to 8.

10. A Mannich adduct comprising at least one compound of the 5 formula Ia and/or Ib.

11. The use of a Mannich adduct as claimed in claim 9 or 10 as a detergent additive in fuel and lubricant compositions.

10 12. An additive concentrate containing, in addition to conventional additive components, at least one Mannich adduct as claimed in claim 9 or 10 in amounts of from 0.1 to 99.9% by weight, preferably 0.5 to 80% by weight.

15 13. A fuel composition containing a main amount of a liquid hydrocarbon fuel and an amount, having detergent activity, of at least one adduct as claimed in claim 9 or 10.

20 14. A lubricant composition containing a main amount of a liquid, semisolid or solid lubricant and an amount, having detergent activity, of at least one adduct as claimed in claim 9 or 10.

25 15. The use of a fuel composition as claimed in claim 13 as a gasoline or diesel fuel.

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